AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1-85. (Canceled)

86. (Previously presented) A method of providing therapy to a patient, comprising:

detecting conditions related to sleep, the sleep-related conditions comprising a condition associated with a sleep-wake status of a patient and a condition associated with REM sleep, wherein the detecting is performed at least in part implantably;

classifying one or more sleep states based on the detected conditions, wherein the classifying is performed at least in part implantably; and

providing sleep state informed therapy using the sleep state classification;

wherein detecting the condition associated with REM-sleep comprises sensing a muscle tone in a pectoral region of the patient.

87. (Previously presented) The method of claim 86, wherein sensing the muscle tone includes sensing the muscle tone using an electromyogram sensor.

88. (Previously presented) The method of claim 86, wherein sensing the muscle tone includes sensing the muscle tone using a sensor mechanically coupled to an implantable medical device.

89. (Previously presented) The method of claim 86, wherein the sleep state informed therapy comprises a cardiac therapy.

90. (Withdrawn) The method of claim 86, wherein the sleep state informed therapy comprises a preventative therapy.

91. (Previously presented) The method of claim 86, wherein the condition associated with the sleep-wake status of the patient comprises patient activity.

92. (Previously presented) The method of claim 86, wherein detecting conditions related to sleep includes detecting patient activity using an accelerometer.

93. (Previously presented) The method of claim 86, wherein detecting conditions related to sleep includes detecting body posture.

94. (Previously presented) The method of claim 86, wherein detecting conditions related to sleep includes detecting whether the patient is asleep or awake.

95. (Previously presented) The method of claim 86, wherein the condition associated with the sleep-wake status includes a patient activity signal, and wherein classifying includes determining sleep onset by comparing the patient activity signal to a sleep threshold.

96. (Previously presented) The method of claim 95, wherein classifying also includes determining sleep offset by comparing the patient activity signal to the sleep threshold.

97. (Previously presented) The method of claim 86, wherein the condition associated with REM sleep includes an REM-modulated signal, and wherein classifying includes determining REM sleep onset by comparing the REM-modulated signal to an REM sleep threshold.

98. (Previously presented) The method of claim 97, wherein classifying also includes determining REM sleep offset by comparing the REM-modulated signal to the REM sleep threshold.

99. (Previously presented) The method of claim 86, further comprising:

detecting a cardiac signal;

wherein the sleep state informed therapy includes bradycardia pacing therapy responsive to the detected cardiac signal and adapted to switch to a lower pacing rate based on the sleep state classification.

100. (Withdrawn) The method of claim 86, further comprising:

detecting a cardiac signal;

wherein the sleep state informed therapy includes preventative arrhythmia therapy responsive to the detected cardiac signal and to the sleep state classification.

101. (Previously presented) The method of claim 86, further comprising:

detecting a cardiac signal;

analyzing the cardiac signal on a beat-to-beat basis;

wherein the sleep state informed therapy is responsive to the beat-to-beat cardiac signal analysis.

102. (Previously presented) The method of claim 86, further comprising:

detecting a tidal volume of the patient's respiration; and

declaring a hypopnea event if the tidal volume falls below a hypopnea threshold.

103. (Previously presented) The method of claim 102, further comprising:

declaring an apnea event if the tidal volume falls below an apnea threshold lower than the hypopnea threshold.

104. (Previously presented) An implantable medical device suitable for implantation into a patient, the device comprising:

a detector system comprising a first and second sensor,

the first sensor configured to detect a first condition associated with REM sleep and suitable for sensing a muscle tone in a pectoral region of the patient, and

the second sensor configured to detect a second condition associated with a sleep-wake status of the patient;

a classification system coupled to the detector system and configured to classify one or more sleep states based on at least one of the first and second conditions; and

a therapy system coupled to the classification system and configured to provide therapy based on sleep state classification.

105. (Previously presented) The device of claim 104, wherein the first sensor is an electromyogram sensor.

106. (Previously presented) The device of claim 104, further comprising:

a housing adapted for implantation in the pectoral region of the patient;

wherein the first sensor is mechanically coupled to the housing.

107. (Previously presented) The device of claim 106, wherein the classification system is disposed within the housing.

108. (Withdrawn) The device of claim 106, wherein the first sensor is positioned on the housing.

109. (Previously presented) The device of claim 106, further comprising a header mounted on the housing, and the first sensor is positioned on the header.

110. (Withdrawn) The device of claim 104, further comprising:

a housing adapted for implantation in the pectoral region of the patient; and

a lead coupled to the housing;

wherein the first sensor is disposed on the lead.

111. (Previously presented) The device of claim 104, wherein the therapy system is configured to provide cardiac therapy.

112. (Previously presented) The device of claim 104, wherein the second sensor includes an accelerometer.

113. (Previously presented) The device of claim 104, wherein the second sensor includes a body posture detector.

114. (Previously presented) The device of claim 104, wherein the first sensor is configured to detect a patient activity signal, and wherein the classification system is configured to determine sleep onset by comparing the patient activity signal to a sleep threshold.

115. (Previously presented) The device of claim 114, wherein the classification system is also configured to determine sleep offset by comparing the patient activity signal to the sleep threshold.

116. (Previously presented) The device of claim 104, wherein the first sensor is configured to detect an REM-modulated signal, and wherein the classification system is configured to determine REM sleep onset by comparing the REM-modulated signal to an REM sleep threshold.

117. (Previously presented) The device of claim 116, wherein the classification system is also configured to determine REM sleep offset by comparing the REM-modulated signal to the REM sleep threshold.

118. (Previously presented) The device of claim 104, wherein the detector system further includes a third sensor configured to detect a cardiac signal, and wherein the therapy system

is configured to provide bradycardia pacing therapy responsive to the detected cardiac signal and to the sleep state classification.

119. (Previously presented) The device of claim 118, wherein the bradycardia pacing therapy is adapted to switch to a lower pacing rate based on the sleep state classification.

120. (Withdrawn) The device of claim 104, wherein the detector system further includes a third sensor configured to detect a cardiac signal, and wherein the therapy system is configured to provide preventative arrhythmia therapy responsive to the detected cardiac signal and to the sleep state classification.

121. (Previously presented) The device of claim 104, wherein the detector system further includes a third sensor configured to detect a cardiac signal, the device further comprising:

an analyzer configured to analyze the cardiac signal on a beat-to-beat basis;

wherein the therapy system is configured to provide therapy based on both the sleep state classification and the beat-to-beat cardiac signal analysis.

122. (Previously presented) The device of claim 104, wherein the detector system further includes a third detector configured to detect a tidal volume of the patient's respiration, and wherein the therapy system is configured to declare a hypopnea event if the tidal volume falls below a hypopnea threshold.

123. (Previously presented) The device of claim 122, wherein the therapy system is also configured to declare an apnea event if the tidal volume falls below an apnea threshold lower than the hypopnea threshold.